Mathematics Toolkit: Grade 7 Objective 1.A.1.a

Standard 1.0 Knowledge of Algebra, Patterns, and Functions

Topic A. Patterns and Functions

Indicator 1. Identify, describe, extend, and create linear patterns and functions

Objective a. Complete a function table with a given two-operation rule

Assessment Limits:

Use the operations (+, -, x), numbers no more than 20 in the rule and whole numbers (0-500)

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Objective 1.A.1.a Tools

Scoring Rubric

Sample Item #1 - Selected Response (SR) Item

Mathematics Grade 7 Objective 1.A.1.a

An ice skating rink charges a special rate on Wednesday nights. The special rate includes a one-time charge of $1 to rent skates plus $2 per hour to skate. The function table below shows the relationship between the number of hours a person skates and the total cost.

Number of Hours	Total Cost
1	3
3	7
5	11
6	?

What is the total cost, in dollars, to skate for 6 hours?

A. $2
B. $6
C. $12
D. $13

Correct Answer:
D

Answer Annotation

A. $2 (number of dollars per hour)
B. $6 (number of hours)
C. $12 (two dollars x 6 hours)
D. $13 (correct answer)

Sample Item #2 - Selected Response (SR) Item

Mathematics Grade 7 Objective 1.A.1.a

Sarah opens a new checking account. She deposits $50 each week and pays a one-time charge of $7 to have her checks printed. The table below shows the relationship between the number of weekly deposits Sarah makes and the total amount of money she has in her checking account.

Number of Weekly Deposits	Total Amount of Money in Account
3	$143
4	$193
7	$343
9	?

A. $387
B. $393
C. $443
D. $457

Correct Answer:
C

Answer Annotation

A. $387 (subtracts 7 x 9, checking printing charge taken each week)
B. $393 (follows an incorrect pattern of the ones digit)
C. $443 (correct answer)
D. $457 (adds 7)

Sample Item #3 - Selected Response (SR) Item

Mathematics Grade 7 Objective 1.A.1.a

The linear relationship shown in the table below uses the rule y = 3(x - 2).

x	*y*
2	0
3	3
4	6
10	24

What is the value of *y* when *x* equals 20?

A. 18
B. 54
C. 58
D. 60

Correct Answer:
B

Answer Annotation

A. 18 (20 - 2)
B. 54 (correct answer)
C. 58 (60 - 2)
D. 60 (3x20)

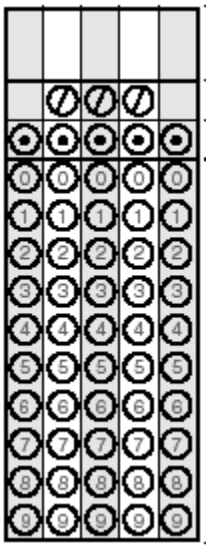
Sample Item #4 - Student Produced Response (SPR) Item

Mathematics Grade 7 Objective 1.A.1.a

Roger rents a power washer to clean his deck. The total cost includes a one-time rental fee of $15 plus $14 for each hour. The table below shows the relationship between the number of hours Roger rents the power washer and the total cost of a rental.

Number of Hours	Total Cost
1	$29
3	$57
4	$71
6	?

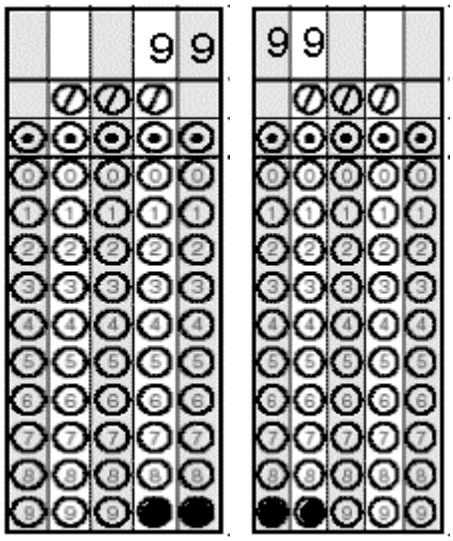
What is the total cost of the power washer rental for 6 hours?



Correct Answer:
99

Answer Annotation

Answer: or



Sample Item #5 - Brief Constructed Response (BCR) Item

Mathematics Grade 7 Objective 1.A.1.a

The linear relationship is the table below uses the rule $y = 6x + 20$

x	y
5	50
13	98
45	290
80	?

Step A

What is the value for y when $x = 80$?

Step B

Explain how you determined this value. Use what you know about function tables in your explanation. Use words, numbers, and/or symbols in your explanation.

Correct Answer:
500

Answer Annotation

Step A Answer: 500

Step B Sample correct response: I know in a function table you must substitute the value from the first column into the expression in the second column. When I substitute 80 into 6c + 20, I get 6 (80) + 20, which is 480 + 20 which equals 500.

Rubric - Brief Constructed Response (BCR)

Score 2
The response demonstrates a complete understanding and analysis of a problem.

- Application of a reasonable strategy in the context of the problem is indicated.
- Explanation[1] of and/or justification[2] for the mathematical process(es) used to solve a problem is clear, developed, and logical.
- Connections and/or extensions made within mathematics or outside of mathematics are clear.
- Supportive information and/or numbers are provided as appropriate. [3]

Score 1
The response demonstrates a minimal understanding and analysis of a problem.

- Partial application of a strategy in the context of the problem is indicated.
- Explanation[1] of and/or justification[2] for the mathematical process(es) used to solve a problem is partially developed, logically flawed, or missing.
- Connections and/or extensions made within mathematics or outside of mathematics are partial or overly general, or flawed.
- Supportive information and/or numbers may or may not be provided as appropriate.[3]

Score 0
The response is completely incorrect, irrelevant to the problem, or missing.[4]

Notes:

[1] Explanation refers to students' ability to communicate how they arrived at the solution for an item using the language of mathematics.

[2] Justification refers to students' ability to support the reasoning used to solve a problem, or to demonstrate why the solution is correct using mathematical concepts and principles.

[3] Students need to complete rubric criteria for *explanation, justification, connections* and/or *extensions* as cued for in a given problem.

[4] Merely an exact copy or paraphrase of the problem will receive a score of "0".

Rubric Document Date: August 2003